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it. It is often said that since we have instantaneous photographs of animals in movement, these should be reproduced by the artist. But this is incorrect; art is concerned not with physics but with psychology.

J. McKEEN CATTELL.

COLUMBIA UNIVERSITY.

SCIENTIFIC NOTES AND NEWS.

THE AMERICAN ASSOCIATION AND 'SCIENCE.'

THIS JOURNAL was established in 1883 by Mr. A. Graham Bell, who, in conjunction with Mr. Gardiner G. Hubbard, spent more than \$80,000 in its support. The loss was so large and continuous that the generous donors were compelled to withdraw their aid, and publication was suspended early in 1894. At the Brooklyn meeting of the American Association for the Advancement of Science, in August, 1894, it was thought that the continuation of such a journal was so important for the advancement of science in America and for the welfare of the Association that an arrangement for cooperation between SCIENCE and the Association was effected and unanimously adopted in the general session of the Association. The JOURNAL agreed to publish part of the papers read before the Association, and the Association appropriated on certain conditions \$750 annually toward the support of the JOURNAL. In view of the moral and financial support of the Association, and by securing an editorial committee and a responsible editor who would serve without compensation, the JOURNAL was reorganized and the publication of a new series was begun in January, 1895.

The JOURNAL has had the generous support of the leading men of science in America. The general character of its contents may be judged from the following presidential addresses which it has been able to publish since the first of January of the present year:

President Morley, before the American Association for the Advancement of Science.

President Cope, before the Society of American Naturalists.

President Shaler, before the Geological Society of America.

President Dwight, before the Association of American Anatomists.

President Hill, before the American Mathematical Society.

President Gilbert, before the Geological Society of Washington.

President Dall, before the Philosophical Society of Washington.

President Rees, before the New York Academy of Sciences.

President James, before the Society for Psychical Research.

President Bowditch, before the Massachusetts State Medical Society.

President Bessey, before the Natural Science Department of the National Educational Association.

President Merriman, before the Society for the Promotion of Engineering Education.

President Trelease, before the Botanical Society of America (in press).

At the Springfield meeting of the Association the subsidy mentioned above was paid to SCIENCE, and the money has been spent in its enlargement. Unfortunately recent meetings of the Association have been small, and it was necessary to take the money from the invested funds of the Association. The meeting at Buffalo last week was even smaller than that at Springfield, and it was believed by friends of the JOURNAL and of the Association that it would be undesirable to use further for any purpose, however important, the invested funds of the Association. But it was hoped that enough members of the Association would subscribe to the JOURNAL to make up the amount of the subsidy promised at Brooklyn.

We have not hitherto mentioned the business affairs of the JOURNAL in its pages, but the editorial importance of its continued efficiency makes it desirable to do so on this occasion. SCIENCE will not be abandoned, even though its continuation may entail serious financial sacri-

fices on the part of a few. We venture, however, to ask those members of the Association who can to subscribe to the JOURNAL. Some of those who are already subscribers may be willing to make one or more additional subscriptions to be used in sending the JOURNAL to members of the Association who cannot themselves afford the subscription.

GENERAL.

THE Paris Academy of Sciences undertook, on the occasion of the Hundredth Anniversary of the death of Lavoisier in 1894, to erect a monument in his honor. An international subscription was opened, and the Academy has just published the subscriptions received up to August 1st of the present year. The names of the subscribers fill fifty pages, the sum so far collected being 47,553.30 fr. We note that the Academy is not without patriotism. Alsace is given the rank of one of the leading nations, being placed between France and Germany. It is a matter for great regret that only the small sum of 500 fr. has been subscribed in the United States, and of this one-fifth is from a zoologist, one-fifth from an electrician and one-tenth from an economist. The subscription is not yet closed, the French Minister of Public Instruction, the City of Paris, the Emperor of Russia and other individuals and institutions intending to assist. It is consequently not too late for subscriptions to be forwarded from America, and it is much to be hoped that the American Chemical Society will undertake to see that America is better represented than a country such as Servia on the final list.

The Critic, which early in the summer published a list of large gifts to American colleges, gives in its current issue from official sources a corresponding list of large gifts and bequests to libraries. The largest of these are as follows: New York Free Library, from members of the Astor family, about \$1,650,000; from James Lennox, \$735,000, in addition to books and land; from the Tilden estate, \$2,000,000; John Crerar Library, of Chicago, from the founder, about \$2,700,000; Newberry Library, of Chicago, from the founder, about \$2,500,000; Carnegie Library, of Pittsburg, from the founder, \$2,100,-

000; Enoch Pratt Free Library, of Baltimore, from the founder, about \$1,080,000; Library Co., of Philadelphia, from the founder, Dr. Rush, about \$1,060,000; President Low's gift of \$1,000,000 for the Library of Columbia University is omitted from the list.

PROF. W. A. HERDMAN has contributed to *Nature* a further account of the arrangements for the approaching meeting of the British Association. Programs of the excursions arranged for four of the sections are given, and an article on the scientific work of the sections is promised for the following week. The Local Secretaries hope to secure Dr. Nansen's presence at the meeting. Before he sailed in the *Fram*, Nansen promised a Liverpool shipowner that he would visit him immediately on his return. He has now been reminded of that promise by telegram to Vardö.

THE American Social Science Association met at Saratoga, beginning on Monday evening, August 31st. The program is a strong one, demonstrating most clearly the needless weakness of Section 'I' of the American Association. Steps should be taken to secure, if possible, an affiliation between the Social Science Association and the American Association.

THE death is announced by cablegram of Nicolas Rudinger, professor of anatomy at Munich. He was sixty-four years of age. We also learn with regret of the death of Dr. H. E. Beyrich, professor of geology and paleontology, at Berlin.

ACCORDING to *Popular Astronomy*, Professor A. Hall, Jr., director of the observatory of the University of Michigan, has secured an extensive series of observations of Polaris for latitude variation. He is also engaged on the division errors of the meridian circle, as no examination of the errors has been made for a long time.

WE are glad to notice, in *Appleton's Popular Science Monthly* for September, the beginning of a series of articles on 'The Vivisection Question,' by Prof. C. F. Hodge, of Clark University. Prof. Hodge is, himself, making experiments on the lower animals which alone will probably alleviate more human and animal suffering than has been caused by all the vivisection experiments that have ever been made.

MR. SAMUEL H. RANCK, of the Enoch Pratt Free Library, Baltimore, calls our attention to articles in the students' journals of Franklin and Marshall College, advocating the use of metric units in college athletics. This is an excellent idea, as very few things would tend more quickly to familiarize the public with the units, and owing to the probable extension of international contests the students of our colleges might favorably consider the plan.

REFERENCE was recently made in these notes to the fact that the decimal system of numeration had its origin in man's having ten fingers. According to the *Revue Scientifique* the *Bibliographie générale de l'astronomie* calls attention to the fact that this was suggested by Aristotle (*Problemata*) and that there are languages in which five and hand are expressed by the same word. It is certainly unfortunate, so far as enumeration and measurement are concerned, that man did not originally have twelve fingers.

WE may reply to Mr. Josephson's letter (see page 315 below) that we have already published a large number of contributions regarding scientific bibliography and should be glad to have others of equal value. The JOURNAL is fortunate in having on its editorial committee Dr. G. Brown Goode, of the Smithsonian Institution, and Dr. John S. Billings, head of the New York Consolidated Libraries, both of whom are eminent authorities on the subject. Dr. Billings and Prof. Newcomb (also of the editorial committee) were the delegates from the American government to the recent Bibliographical Conference in London.

THE New York *Evening Post* states that Prof. C. W. Dodge, of the biological department of the University of Rochester, has asked the trustees to make an appropriation for the establishment of a biological laboratory at Hemlock Lake, a small lake thirty miles south of Rochester, from which it obtains its water supply. He proposes to make a complete biological survey of the lake and to utilize the services of the expert students in his department for the work.

ACCORDING to the *Electrical World* there were about 200 delegates present at the International

Congress of Electricians which was opened in the Aula of the Geneva University, on Tuesday, August 4th. M. Turretini presided and papers were read by Dr. Weillishbach, on 'Telephonic Disturbances caused by Electric Traction;' by M. Hospitalier on 'Magnetic Units;' and by M. André Blondel on 'Photometric Units.' Among the subjects discussed was the question of transmission of power over long distances, and practical exhibitions of its transmission were made at the exposition.

THE War Department has sent to Paris for a set of the Bertillon instruments, and a thorough examination will be made into the system of identification with a view of introducing it into the United States army.

A MOUND has been explored at McKee's Rocks, near Pittsburg, by Mr. Thomas Harper and found to contain stone and bone implements and skeletons which are said to be of special interest and will be deposited in the Carnegie Museum.

SIBERIAN exiles are supposed to suffer peculiar hardships, but the St. Petersburg correspondent of *The Lancet* states that last year an old peasant named Ivan Kouzmin was reported to have traveled from Moscow to Kief at the age of 140. He was said to be in good health; he had formerly been a coachman to Count Sheremétief, but in 1840 was sent to Siberia, where he spent fifty-four years, returning in 1894. His is not the only instance in which a Siberian exile has survived to extreme old age. Two years ago there was said to have died in Samara one Lavrentii Efimof, who had attained the age of 150. According to the newspaper report of him he took part as a boy in the famous Pugatchef rebellion in the reign of Catherine the Great, and for his share in that outbreak spent thirty years of his life in Siberia.

IT is reported in the daily papers that a cave, said to be the largest in the world, has been discovered near Hudson, Mo. In the *Scientific American* of August 29th, Mr. H. C. Hovey gives an interesting description of the cave discovered by Mr. Pike Chapman in July of last year; this is one of a number of caves found in the vicinity of the Mammoth Cave and appears to be of considerable importance. It must be

entered through the tip of a subterranean dome by means of ladders, and the lowest level of the cavern is 250 feet below the entrance. There are a number of fine domes, and passageways miles in extent. The effect is said to be very fine, as the crystals have not yet been injured by the smoke of lamps and fireballs.

AMERICAN students will be interested in an article in *Science Progress* for August, on 'Petrology in America,' by Mr. Alfred Harker, of St. John's College, Cambridge. The author gives an account of the results of some thirty-seven investigations. The author writes:

"The material for study offered to the American geologist is rich in many respects, and perhaps in no branch richer than in petrology. The vast tracts of Tertiary lavas along and to the west of the Rocky Mountains, the peculiar igneous rocks on the east side of the great watershed, the varied series of lavas, tuffs, and intrusive masses in the Palæozoic and older formations of the Eastern States, the extensive areas of igneous and other crystalline rocks in the Lake Superior region, the Adirondaeks, Canada, etc., all present many points of interest, and much valuable work has already been done in the description and study of these rocks. These results we owe in large part to the United States Geological Survey and that of Canada, and to various State surveys; Minnesota, New York, Arkansas, Texas, etc. Besides this official work, systematic petrographic research has been carried on at several universities and colleges, such as Johns Hopkins, Columbia College, Yale, the University of California, and others."

ANOTHER paper of interest to American geologists in the same journal and also by a member of St. John's College, Mr. Philip Lake, is on 'The Work of the Portuguese Geological Survey.' The official *Comunicação da Direcção dos Trabalhos geologicos de Portugal* may be difficult reading for many (although a large part of the memoirs has also been published in French) and Mr. Lake's account of the recent work of the survey, which is of very considerable importance, is thus opportune.

M. HENRI MOISSAN has reported to the Paris Academy that he has found, in disintegrated rocks from Brazil, microscopic diamonds, both black and transparent, and that they were in connection with graphite.

STUDENTS of primitive culture are inclined to attribute a wider and wider extension, as their

knowledge of early conditions increases, to the matriarchal system of the family. Prof. E. B. Tylor, in the *Nineteenth Century*, reaches the conclusion that it has existed, in either a complete or a partial form, among about half of known peoples of the lower culture. Attention should be called in this connection to an important book on the subject by Mrs. Gamble, which was issued by Putnam two years ago. Prof. Tylor attributes the decadence of the custom to the spread of exogamy, which latter practice gave the tribes which adopted it an advantage on account of its cementing friendship and preventing fighting among larger and larger bodies of men. He mentions the curious fact that a Methodist missionary among the Maoris has lately been inculcating exogamy among his people with this same end, and with very good results.

- C. L. F.

At the recent International Psychological Congress at Munich, Mr. George M. Stratton, of the University of California, reported some interesting experiments on vision without inversion of the retinal image. An optical instrument with lenses appropriately arranged produced such an image, and at the same time excluded from the eyes all rays except those coming through these lenses. This instrument was worn on the eyes without intermission (except at night, when the eyes were blindfolded) from three o'clock in the afternoon of the first day until noon of the third day. The experience was somewhat as follows: all visual images seemed at first inverted and illusory. The things themselves were thought of as being, not where now seen, but where they would probably appear could normal vision be restored. Later, however, the present visual presentations seemed 'real.' Objects outside the field of vision began to be mentally represented in terms of the new abnormal vision; they were pictured as they would appear if the present visual field were moved or widened to include them.

At the meeting of the Paris Academy of Science on August 17th, M. Weinek exhibited a further series of photographs of the moon, the negatives having been in part taken at the Lick Observatory and in part at the Observa-

tory of Paris. The enlargement is such as to give a diameter to the entire disk of the moon of more than three meters and, as the photographs are 30x24 cm., there are a large number of separate sheets. The definition in these photographs is said to be admirable.

THE ethics of quotation without assigning the source of the information are somewhat complex. We aim always to give credit to its source when we take a note from a journal that has in fact or apparently received the information at first hand. Our excellent contemporary, the *Revue Scientifique* does not seem to adopt this point of view, but finds SCIENCE of weekly use. In the current number it goes so far as to take from *Nature*, without credit, an account of Mr. Lindenkohl's observations on the Gulf Stream, (which *Nature* properly credited to SCIENCE), but states quite correctly (as quoted by *Nature* from this JOURNAL), that this apparently original information *will* be published in a report of the U. S. Coast and Geodetic Survey.

IN *Appleton's Popular Science Monthly* for September will be found an article by President David Starr Jordan, entitled 'The Sympsycho-graph,' the contents of which are even more extraordinary than its title. The writer of this note was at first under the impression that the article was intended as a parody on newspaper literature regarding X-rays and psychical research, but this will certainly not be the opinion of readers of the *Monthly*. President Jordan's first paragraph is as follows:

"The Astral Camera Club, of Alcalde, was organized in November, 1895, for purposes of scientific research through the medium of photography. The function of the club was the cooperative study of man's latent psychical powers, that these might be helpful in the conduct of life. No powers granted man should be neglected or allowed to waste in idleness. Just as the great physical force of electricity remained for centuries hidden and known only by casual and unimportant manifestations, so the great odic forces within man are still scantily revealed. The method of the club in Alcalde was to be that of the most rigid scientific research. It was to take up, one after another, the discoveries of our eager century as they were made known to the world through the medium of the daily newspaper. To these were to be added those suggestions which alert intuition and

psychic practicality would naturally suggest. No hypothesis in science was to be rejected beforehand, and no prejudice was to stand in the way of the reception of any new theory that might contain a living truth."

President Jordan then proceeds to describe the alleged photographs of the retina by Messrs. Rogers and Lee, and states that their full significance was first brought out at a meeting of the Astral Camera Club on April 1st: "The supremacy of mind over matter, already indicated in a hundred ways, was thus splendidly illustrated. As a thousand miles of ether may be made to vibrate, at the command of the will of the psychic adept, so may the grosser forms of matter be shaken or removed when this subtle and resistless force acts upon it."

Later in the article will be found a description of an experiment made with an instrument exhibited by Mr. Marvin, the president:

"He had devised a camera with a lens having curved facets arranged on the plan of the eye of the fly. To each one of the seven facets led an insulated tube provided within by an electric connection, so that electric or odic impulses could be transferred from the brain or retina through the eye of each different observer to the many-faced lens. From the lens these impulses would be converged on a sensitive plate, as the rays of light are gathered together in ordinary photography. From the members of the Camera Club, seven of those having greatest animal magnetism and greatest power of mental concentration were chosen for the experiment. Connection was made from the eye of these observers to the corresponding parts of the lens; then all were to remain in utter darkness and perfect silence, each person fixing his mind on a cat."

The composite 'psychograph' of the cat is reproduced "in advance of the publication or the regular bulletin of the Society in which the apparatus used is figured in detail." We must admit that we may need at any time to begin our science over again from the beginning, but President Jordan and the editors of *Appleton's Popular Science Monthly* take great responsibility in dating this from a meeting of 'The Astral Camera Club.'

WE regret to criticize a second article in *Appleton's Popular Science Monthly*, a journal which accomplishes so much for the diffusion of scientific knowledge, but an extended editorial article on the speech by Lord Kelvin, on the occasion

of the recent Jubilee Celebration (printed in *SCIENCE*, IV., p. 68) appears to be very unfortunate. Lord Kelvin said finely :

"But when I think how infinitely little is all that I have done I cannot feel pride ; I only see the great kindness of my scientific comrades and all of my friends in crediting me for so much. One word characterizes the most strenuous of the efforts for the advancement of science that I have made perseveringly during 55 years ; that word is failure. I know no more of electric and magnetic force or of the relation between ether, electricity and ponderable matter, or of chemical affinity, than I knew and tried to teach my students of natural philosophy 50 years ago in my first session as professor. Something of sadness must come of failure ; but in the pursuit of science inborn necessity to make the effort brings with it much of the *certaminis gaudia*, and saves the naturalist from being wholly miserable, perhaps even allows him to be fairly happy, in his daily work. And what splendid compensation for philosophical failures we have had in the admirable discoveries by observation and experiment on the properties of matter, and in the exquisitely beneficent applications of science to the use of mankind with which these 50 years have so abounded !"

We are informed that this is 'a false note' and 'false sentiment.' We are told that Lord Kelvin ought to have said :

"Science in my day has been most prolific of blessing to mankind ; it is proceeding apace with its appointed task of enabling men to understand *for practical purposes* the world in which they live, and what shall be the limit to its achievements in that direction no one can foretell. As to the 'riddle of the universe,' of which we sometimes hear, that lies beyond its ken ; only when thought ceases to be conditioned will that riddle—not be read but—disappear."

Lord Kelvin has doubtless also read Mr. Spencer's works, and in any case was not regretting that he had not seen the Holy Grail by means of fasting or 10 grs. of hashish. It was a fine thing to acknowledge in the presence of those who had gathered to celebrate his contributions to science and invention that he had failed to learn what he most desired to teach 'the relation between ether, electricity and ponderable matter.' We remember the reply of the savant when asked a certain question, "Madame, I do not know." "Then what is the use of your science?" "Madame, to be able to answer, 'I do not know.'"

UNIVERSITY AND EDUCATIONAL NEWS.

THE chemical laboratory building at the University of Illinois was destroyed by fire on August 17th. The building was three stories high above the basement and contained five laboratories. It was one of the largest and best of its kind in the country and was erected at a cost of \$40,000. The fittings, apparatus and supplies are estimated to have brought the entire value to \$75,000. The *Scientific American*, from which we take this item, states that it is supposed that the laboratory was struck by lightning, but it seems possible that this, like the recent fire, in the Harvard chemical laboratory, may have been due to spontaneous combustion of chemicals.

It is commonly supposed that Princeton is 'a rich man's college.' The authorities of the University have, however, issued a pamphlet entitled 'The Cost of an Education at Princeton,' showing that of 54 honor men nearly three-fourths expended only \$500 or less annually, and nearly one-half \$400 a year or less.

ACCORDING to the *N. Y. Evening Post* the Marquis of Bute has signified his intention of contributing £10,000 to the University of South Wales, to be applied to the purposes of technical education in Wales. The Drapers' Company has also promised £10,000 towards the fund for providing new buildings, and the British government has promised £20,000 on condition that an equal amount be raised by public subscriptions.

WE learn from *Nature* that the Technical Education Board of the London County Council has addressed a letter to the Councils of University and King's Colleges on the subject of the financial assistance to these institutions during the forthcoming session. It is pointed out in this letter that the Board cannot undertake to ensure regular annual grants towards either of these colleges. It is further recommended that the Councils of the two colleges should confer together before making any application for assistance, with a view of coordinating the work now specially carried on in connection with Oriental languages. A question has been raised regarding King's College, as to